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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/358,940	07/22/1999	WHONCHEE LEE	3028.1US-(96	2152

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EXAMINER	
PEREZ RAMOS, VANESSA	
ART UNIT	**PAPER NUMBER**
1765	21

DATE MAILED: 01/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/358,940	Applicant(s) LEE ET AL.	
	Examiner Vanessa Perez-Ramos	Art Unit 1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 November 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 6-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 6-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-4 and 6-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grant et al. (U.S. 5,439,553) in view of Gigante (U.S. 4,372,803) and in further view of Lin (U.S. 6,251,742).

In regard to claims 1-4, 6 and 8-14, Grant discloses an etchant vapor which selectively etches BPSG, comprising an organic acid (col. 3, lines 59-61, col. 4, line 10), which can be acetic acid (col. 3, line 67; col. 4, line 12), and a fluoride-containing solution, including HF (col. 4, lines 23-25).

Grant does not disclose a preferred volumetric ratio of the organic acid to the fluoride containing solution. Furthermore, Grant discloses a vapor rather than a solution, like the claimed invention does.

Grant, however, does disclose that the variation of process parameters such as ratio of components is expected (col. 6, lines 18-21).

Gigante discloses an etchant composition comprising an organic acid and HF in a ratio of 10:1 (col. 4, lines 22-23).

Lin discloses a semiconductor manufacturing process, and further discloses the equivalence between HF etching solutions (liquid) and vapor-phase etchants for layer etching (col. 3, lines 59-60).

It is the Examiner's position that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Grant by utilizing the ratio of the organic acid to the fluoride containing solution used by Applicant, as per Gigante, since Grant himself provides a motivation to do so, because the ratio is well known in the art as evidenced by Gigante's disclosure, and, furthermore, because the volumetric ratio is a result-effective variable, and its variation would have been expected from and obvious to one skilled in the art with the purpose of establishing the optimum process conditions. Furthermore, it is the Examiner's position that the use of an etchant solution instead of a vapor-phase etchant would have been obvious to one skilled in the art, if only for experimentation purposes, in view of Lin's disclosure regarding the equivalence of both, and in anticipation of an expected result.

In regard to claims 7 and 15, the use of ammonium fluoride as the fluoride-containing species would have been obvious to one of ordinary skill in the art at the time of the invention, because its use is common in the art, and because Grant provides the motivation to try different fluoride containing species, as disclosed in col. 4, lines 24-25.

3. The following prior art is considered pertinent to Applicant's claimed invention: U.S. 5654244 to Sakai, U.S. 6335279 to Jung and U.S. 6077742 to Chen, all of which disclose the equivalence between vapor-phase and liquid-phase etchants.

Response to Arguments

4. Applicant's arguments filed 11/5/02 have been fully considered but they are not persuasive.

Applicant argues that Grant does not disclose an etchant solution, but rather "a vapor phase treatment method (Grant, abstract)". The Examiner had previously recognized this deficiency, and had provided references that teach the equivalence between liquid and vapor etchant solutions in semiconductor manufacturing (Lin (U.S. 6,251,742), Sakai (U.S. 5,654,244), Jung (U.S. 6,335,279) andChen (U.S. 6,077,742)).

Applicant argues that Grant discloses that his method can be used to etch BPSG but makes no mention of TEOS. Grant's method is directed to the selective etching of BPSG over other oxides (col. 1, lines 7-9; col. 7, lines 12-13). TEOS is an oxide, and thus Grant's disclosure reads on Applicant's claimed limitation of BPSG and TEOS.

Applicant further argues that Gigante and Lin lack any disclosure about etching BPSG selectively with regard to TEOS. It is noted, however, that the Examiner relied on the teachings of Gigante to show that the preferred volumetric ratio claimed by Applicant is well known in the art. Furthermore, the Examiner relied on the teachings of Lin only to show the equivalence between vapor phase and liquid phase etchants. Grant (the primary reference) discloses the etching of BPSG over TEOS and other oxides as the claimed invention does.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or

modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, all of the references utilized by the Examiner are directed to the improvement of semiconductor manufacturing methods. The goal of further improving the methods of the references provides the motivation to combine them.

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vanessa Perez-Ramos whose telephone number is 703-306-5510. The examiner can normally be reached on Mon-Thurs 7:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on 703-308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-5665.

Vanessa Perez-Ramos
Examiner
Art Unit 1765

VPR
January 12, 2003

BENJAMIN L. UTECH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700